

Applicant : B guslaw Swedek et al
Serial No. : 09/847,867
Filed : May 2, 2001
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Attorney's Docket No.: 05542-451001 / 5252/CMP

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (previously presented): An apparatus for chemical mechanical polishing, comprising:
 - a platen to support a polishing surface;
 - an eddy current monitoring system positioned in the platen to generate a first signal;
 - an optical monitoring system positioned in the platen to generate a second signal;
 - circuitry in the platen to combine the first signal from the eddy current monitoring system and second signals from the optical monitoring system into a third signal on an output line; and
 - a computer to receive the third signal on the output line and extract the first and second signals.
2. (original): The apparatus of claim 1, wherein the platen is rotatable.
3. (original): The apparatus of claim 2, further comprising a rotary electrical union, and wherein the output line passes through the rotary electrical union between the circuitry and the computer.
4. (original): The apparatus of claim 1, further comprising a carrier head to hold a substrate in contact with the polishing surface.
5. (original): The apparatus of claim 1, wherein the circuitry assembles data from the first and second signals into packets, and the computer extracts the data from the packets.
- 6-15 (canceled)

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16. (original): A chemical mechanical polishing apparatus, comprising:
- a polishing surface;
 - a carrier head to hold a substrate having a conductive layer disposed thereon in contact with the polishing surface;
 - a motor to create relative motion between the substrate and the polishing surface;
 - an eddy current monitoring system including an inductor and a current source to drive the inductor to generate an alternating magnetic field that induces eddy currents in the conductive layer;
 - a sensor to measure a strength of the magnetic field and a phase difference between the magnetic field and the drive signal; and
 - a computer configured to calculate a correction factor based on the strength of the magnetic field and calculate a thickness of the conductive layer from the phase difference and the correction factor.
17. (previously presented): An apparatus for chemical mechanical polishing, comprising:
- a platen to support a polishing surface;
 - a carrier head to hold a substrate;
 - an eddy current monitoring system to generate a first signal during polishing, the eddy current monitoring system including a coil wrapped around a core to generate a magnetic field that extends to a first region of the substrate;
 - an optical monitoring system positioned to generate a second signal during polishing, the optical monitoring system including a light source, the light source positioned and oriented to direct a light beam to a spot in the first region of the substrate so that the eddy current monitoring system and optical monitoring system measure substantially the same location on the substrate.

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18. (previously presented): An apparatus for chemical mechanical polishing, comprising:
a polishing surface;
a carrier head to hold a substrate against the polishing surface;
an eddy current monitoring system to generate a first signal during polishing, the eddy current monitoring system including an inductor to generate a magnetic field that extends to a first region of the substrate, wherein the eddy current monitoring system includes a core having a plurality of prongs; and

an optical monitoring system positioned to generate a second signal during polishing, the optical monitoring system including a light source, the light source positioned and oriented to direct a light beam to a spot in the first region of the substrate so that the eddy current monitoring system and optical monitoring system measure substantially the same location on the substrate, the optical monitoring system includes a detector positioned at least partially between the prongs.

19. (original): The apparatus of claim 18, wherein the light beam impinges the substrate at a point substantially equidistant from the prongs.

20. (previously presented): An apparatus for chemical mechanical polishing, comprising:

a polishing surface;
a carrier head to hold a substrate against the polishing surface;
an eddy current monitoring system to generate a first signal during polishing, the eddy current monitoring system including an inductor to generate a magnetic field that extends to a first region of the substrate, wherein the eddy current monitoring system includes a core; and
an optical monitoring system positioned to generate a second signal during polishing, the optical monitoring system including a light source, the light source positioned and oriented to direct a light beam to impinges the substrate at a spot in the first region of the substrate directly

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above the core so that the eddy current monitoring system and optical monitoring system measure substantially the same location on the substrate.

21. (previously presented): The apparatus of claim 16, wherein the correction factor is indicative of a pad thickness.

22. (previously presented) : The apparatus of claim 21, wherein the computer calculates the correction factor indicative of the pad thickness using the strength of the magnetic field corresponding to an initial thickness of the conductive layer.